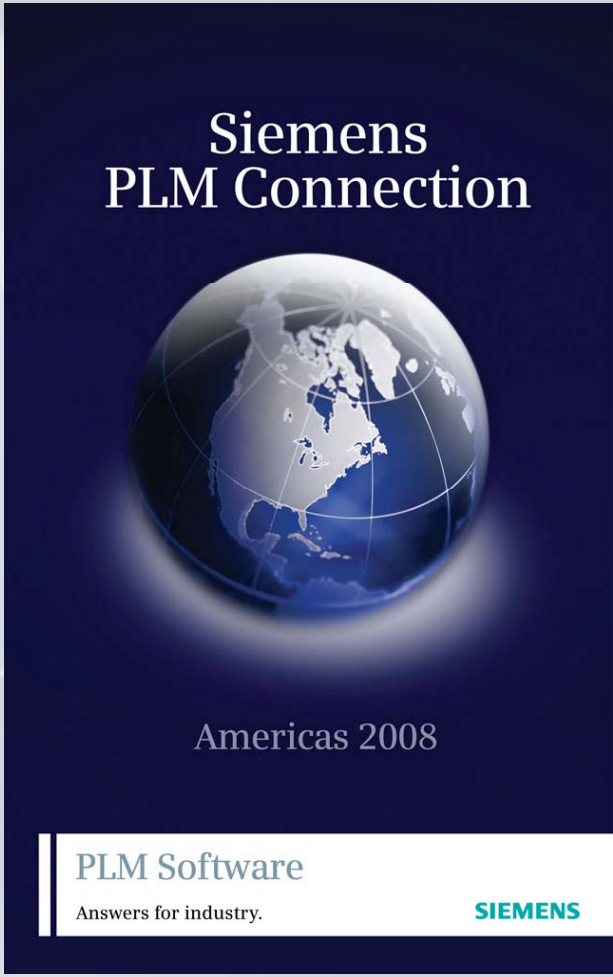
SIEMENS

Siemens PLM Connection

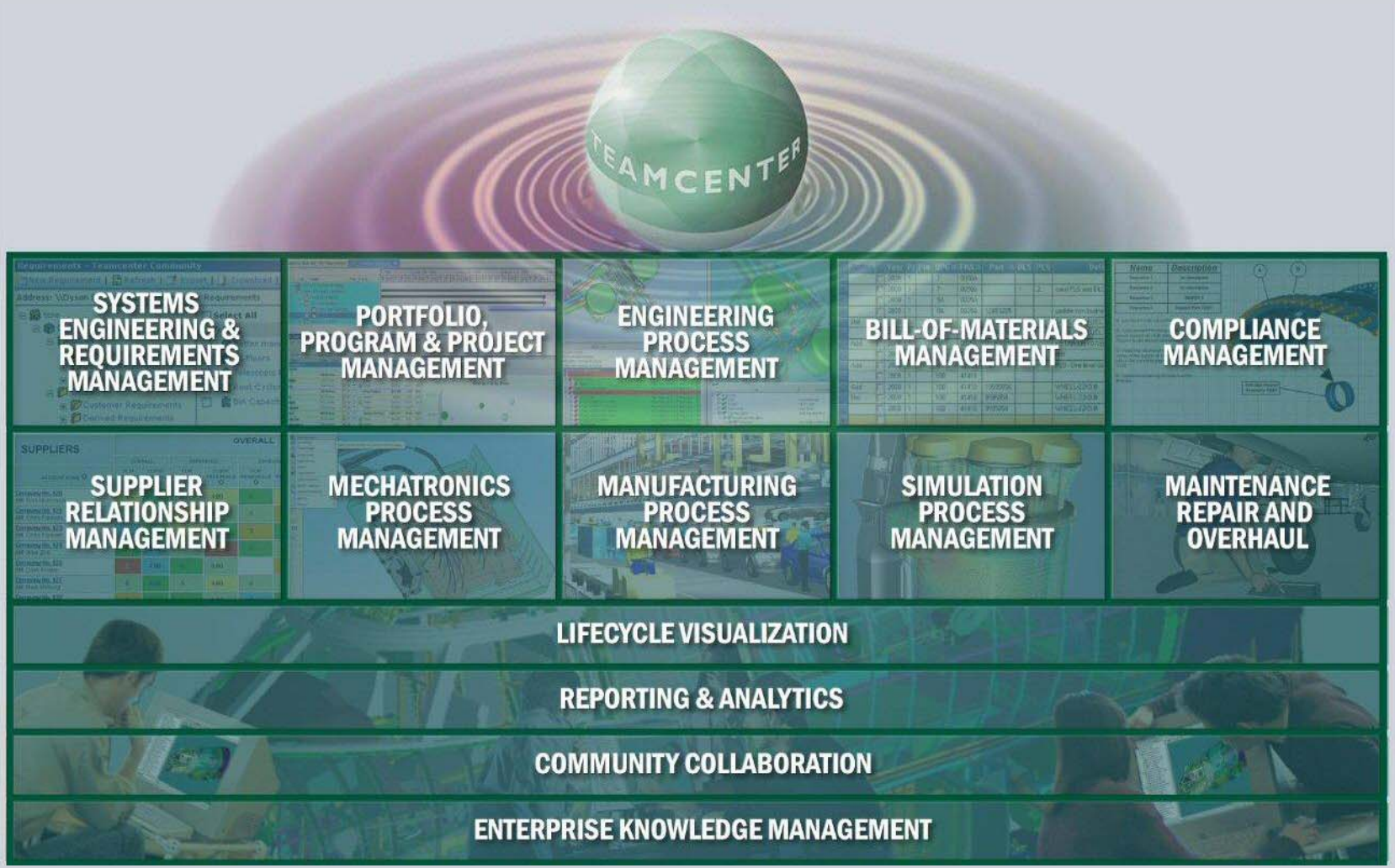
Teamcenter Middle Tier Overview

- Vikas Singh



SIEMENS

Teamcenter Digital Lifecycle Management Solutions



Enterprise Knowledge Management

Teamcenter Middle Tier Overview

- Teamcenter 4-Tier Architecture
- Key benefits
- Reference Implementation Architecture
- Horizontal Scalability and Failover
- Server Assignment
- Pool Configuration
- Server Management Example
- Double Failover Use Case
- 2-Tier and 4-Tier over WAN
- Deployment Scenarios

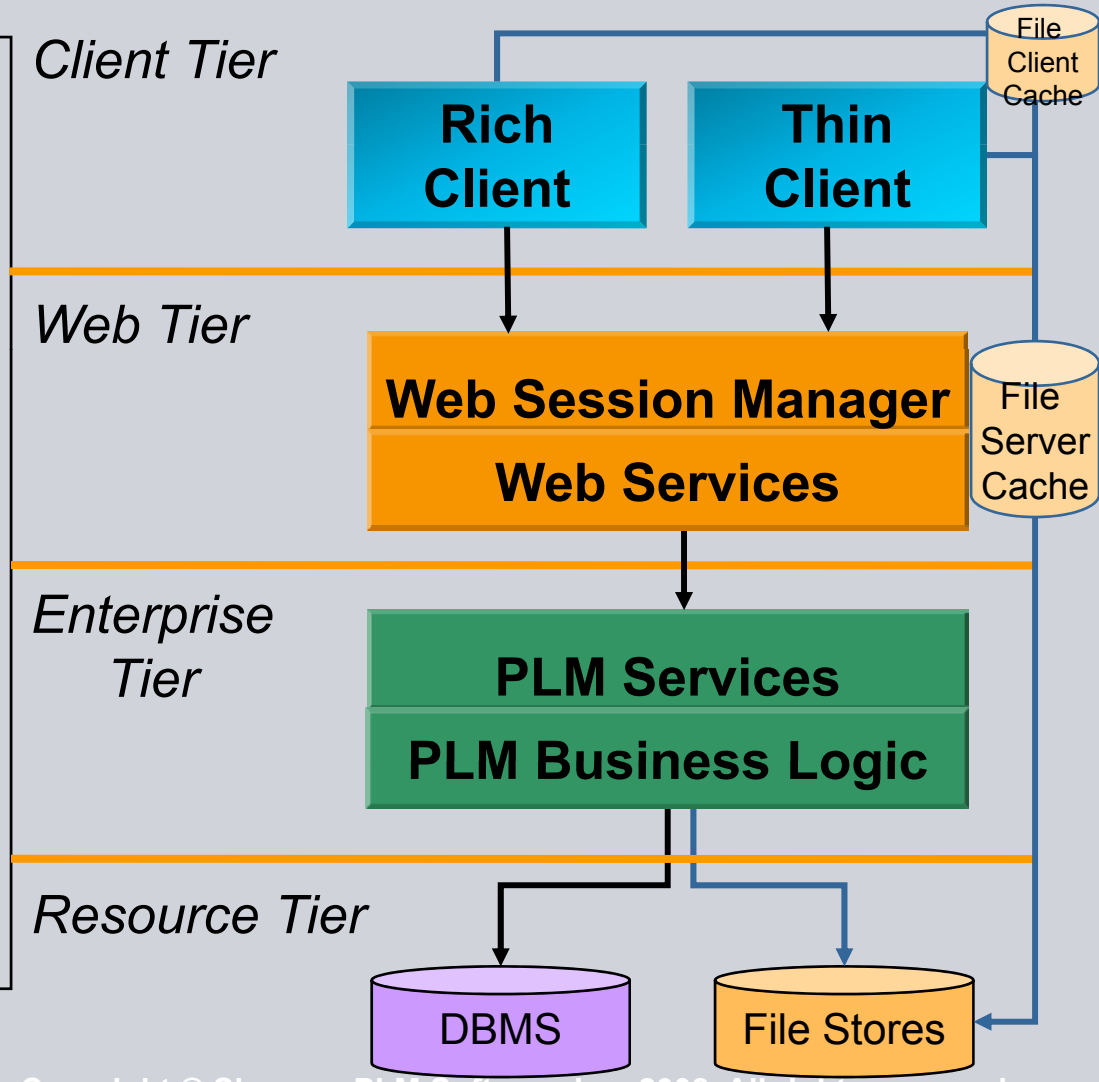
Introduction to the Teamcenter 4-Tier Architecture

Teamcenter's unified platform architecture is built in 4 functional tiers:

- Separates different hardware requirements to support scalability
- Industry standard layout to facilitate deployment in existing IT environments

All meta-data requests from clients are sent via the Web Tier to the Enterprise Tier to be processed

All file access requests are sent direct to file stores for direct, secure file transfer



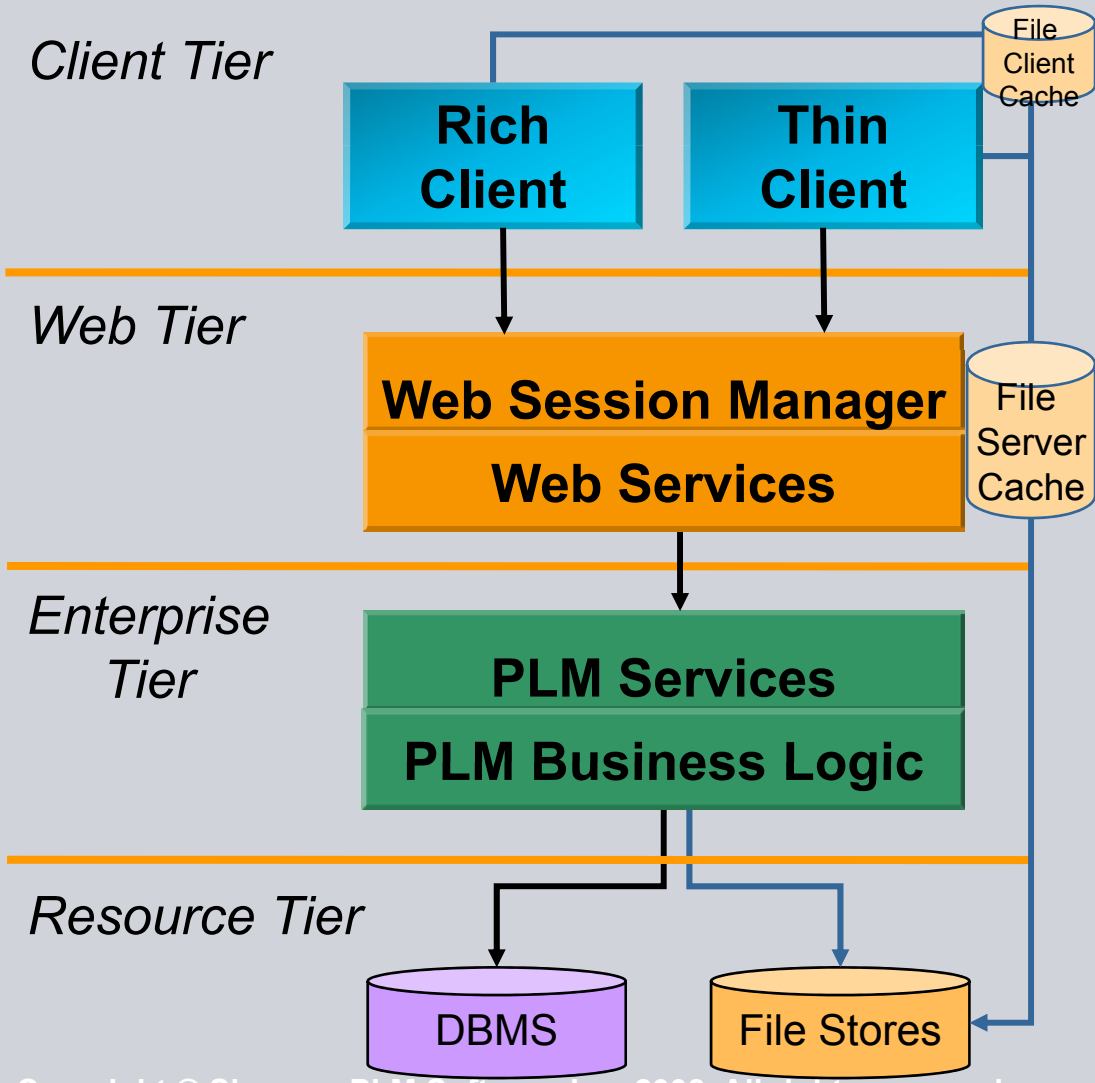
Introduction to the Teamcenter 4-Tier Architecture

Client Tier:
- Host client applications
- Provide user interface
- Host secure file caches

Web Tier:
- Route client requests to business logic
- Serve static content
- Process login requests

Enterprise Tier:
- Host business logic
- Apply security rules
- Serve dynamic content

Resource Tier (DB)
- Store persistent meta-data (tables) and files

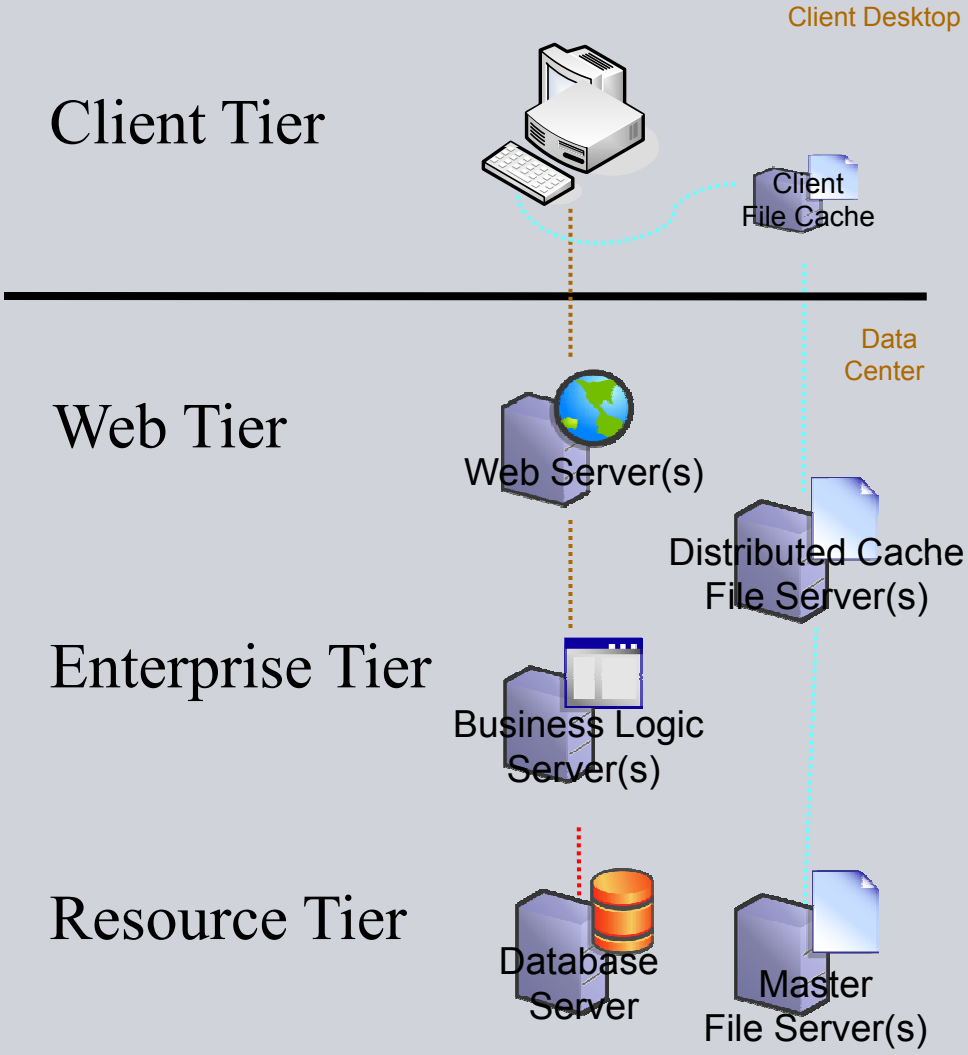


SIEMENS

Teamcenter 4-Tier Architecture Key Benefits

Teamcenter's unified architecture:

- Scales to allow thousands of users on a database
- Supports clients both on a local network and geographically distributed worldwide
- Enables global collaboration within and across organizations
- Leverages standards for security, interoperability, portability, deployment
- Allows great flexibility in deployment sizes and styles
- Centralizes management of Web and Enterprise Tiers



SIEMENS

Teamcenter 4-tier Additional Components

- In addition to client and server processes in 2-tier, the 4-tier architecture includes
  - Web Tier
  - Server Manager (on Enterprise Tier)

- Technology stacks
  - J2EE
    - J2EE Web Tier application – Servlets, JSPs, EJBs, JCA, CORBA, J2EE Application Servers, HTTP Web Servers, Proxies
  - .NET
    - .NET Web Tier application, ASP .NET 2.0, C++/C# components .NET remoting, IIS6.0, Windows 2003 Server, CORBA

Reference Implementation Architecture

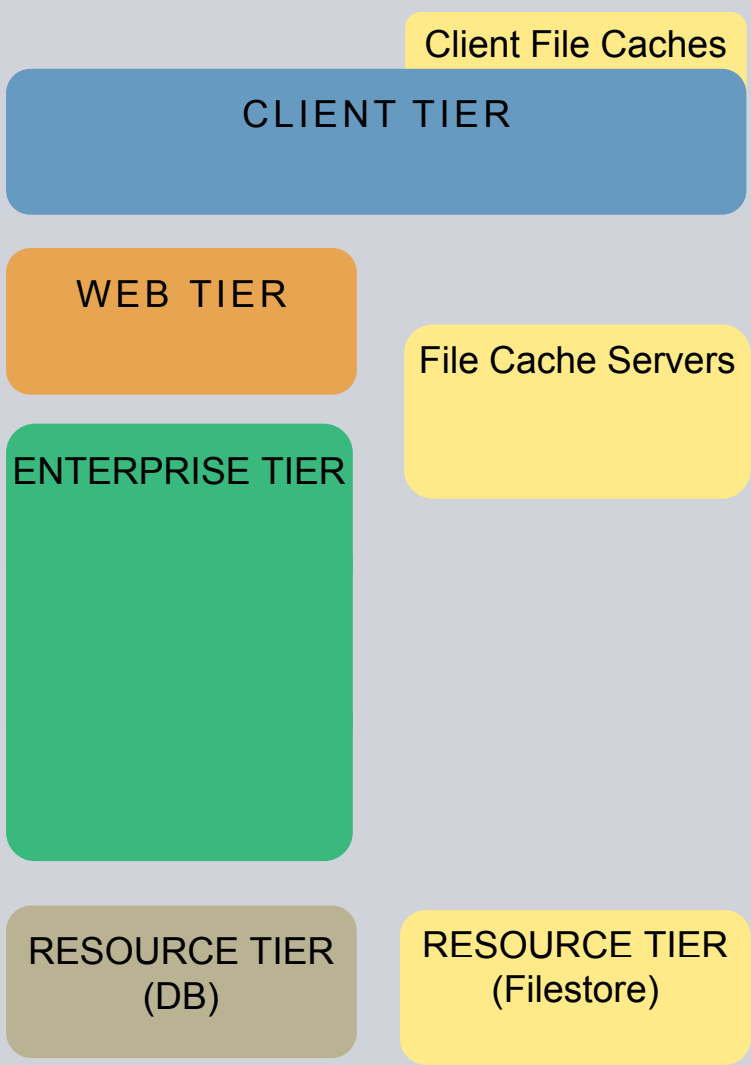
SIEMENS

Client Tier:
J2SE, C++, .Net/C# rich clients
DHTML, Javascript, applets, ActiveX
HTTP/S communications

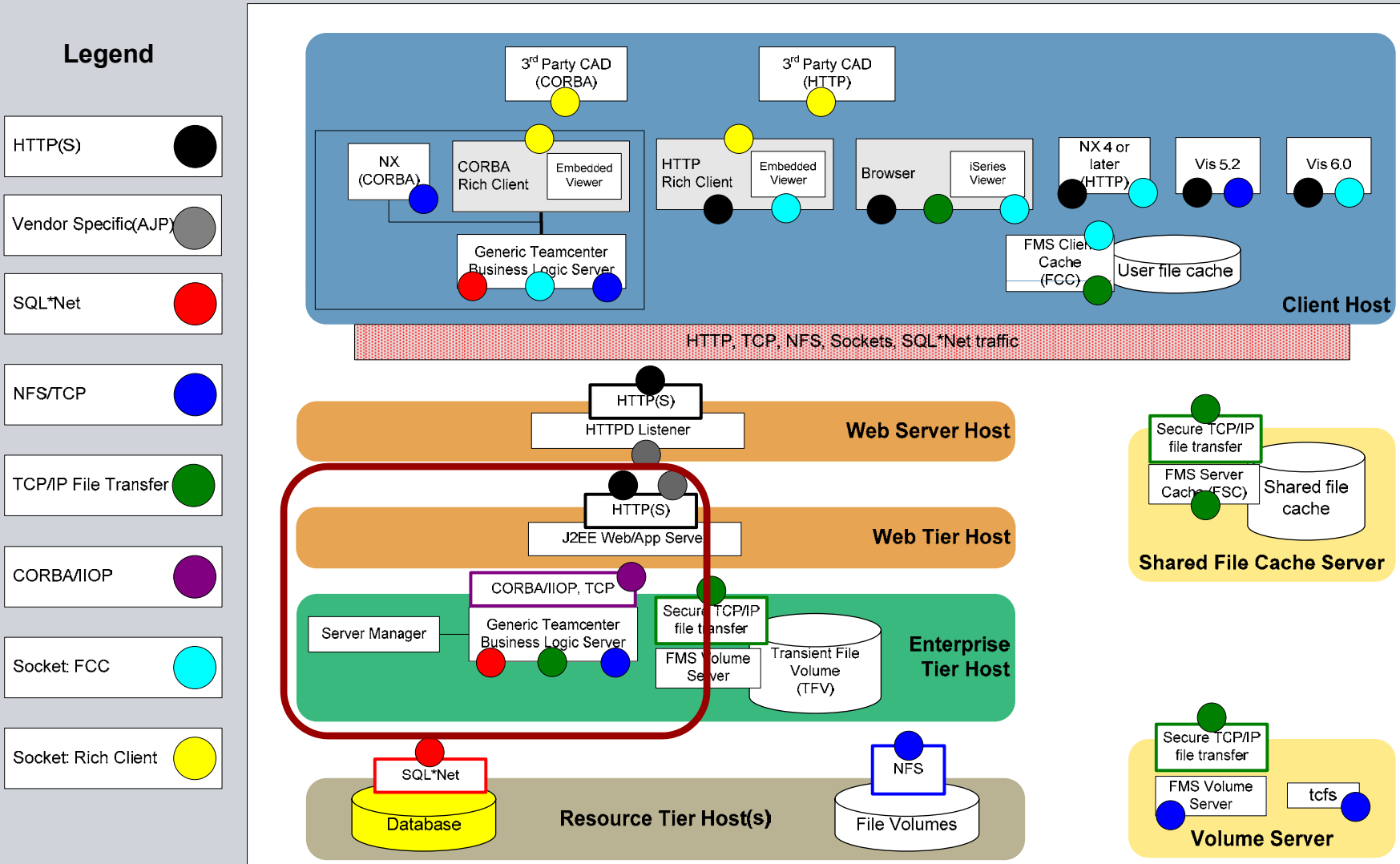
Web Tier:
Web – ASP, JSP, servlets, MS .Net, SOAP, Web Services, IIOP
Apache, IIS
Leading J2EE Application Servers
BEA, IBM, SUN, Oracle JBoss,…
Windows Server 2003 with .Net

Enterprise Tier:
C++, TCScript, CORBA, J2SE Security/LDAP
Sun, Oracle, MS, IBM

Resource Tier (DB)
Unix, Windows, Linux
Oracle, SQL*Server

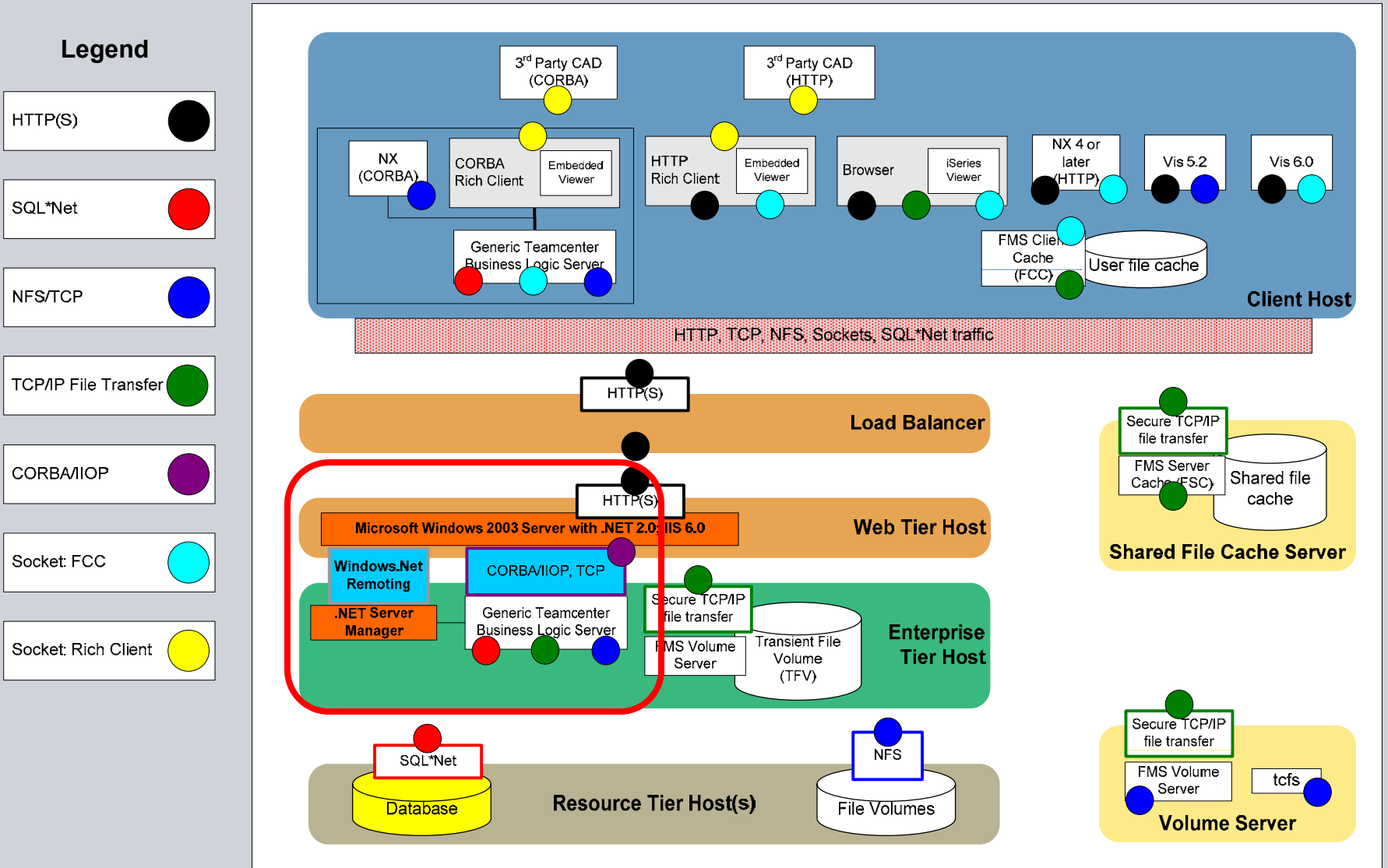


Teamcenter J2EE 4-Tier Architecture



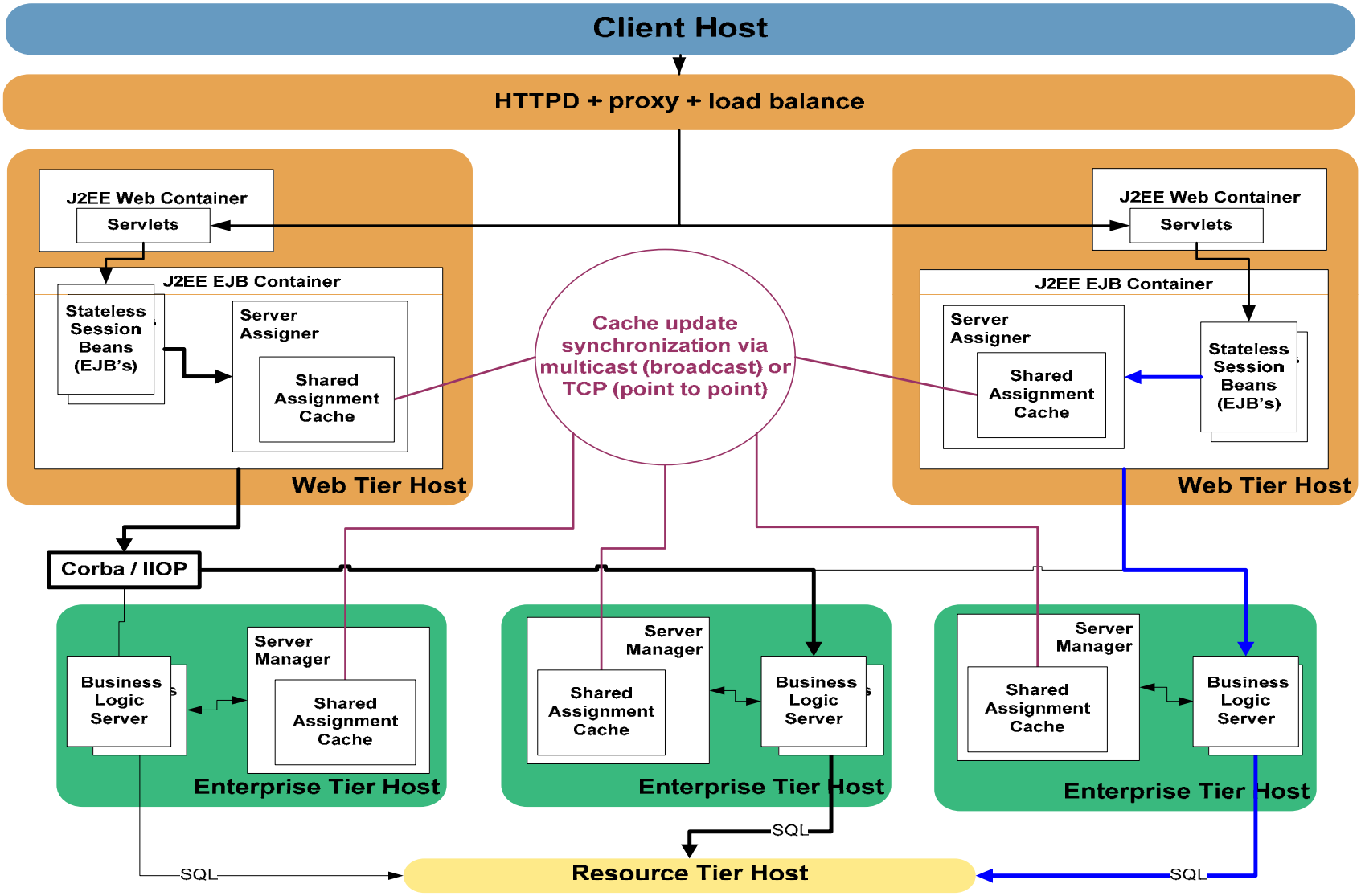
Teamcenter .NET 4-Tier Architecture

SIEMENS



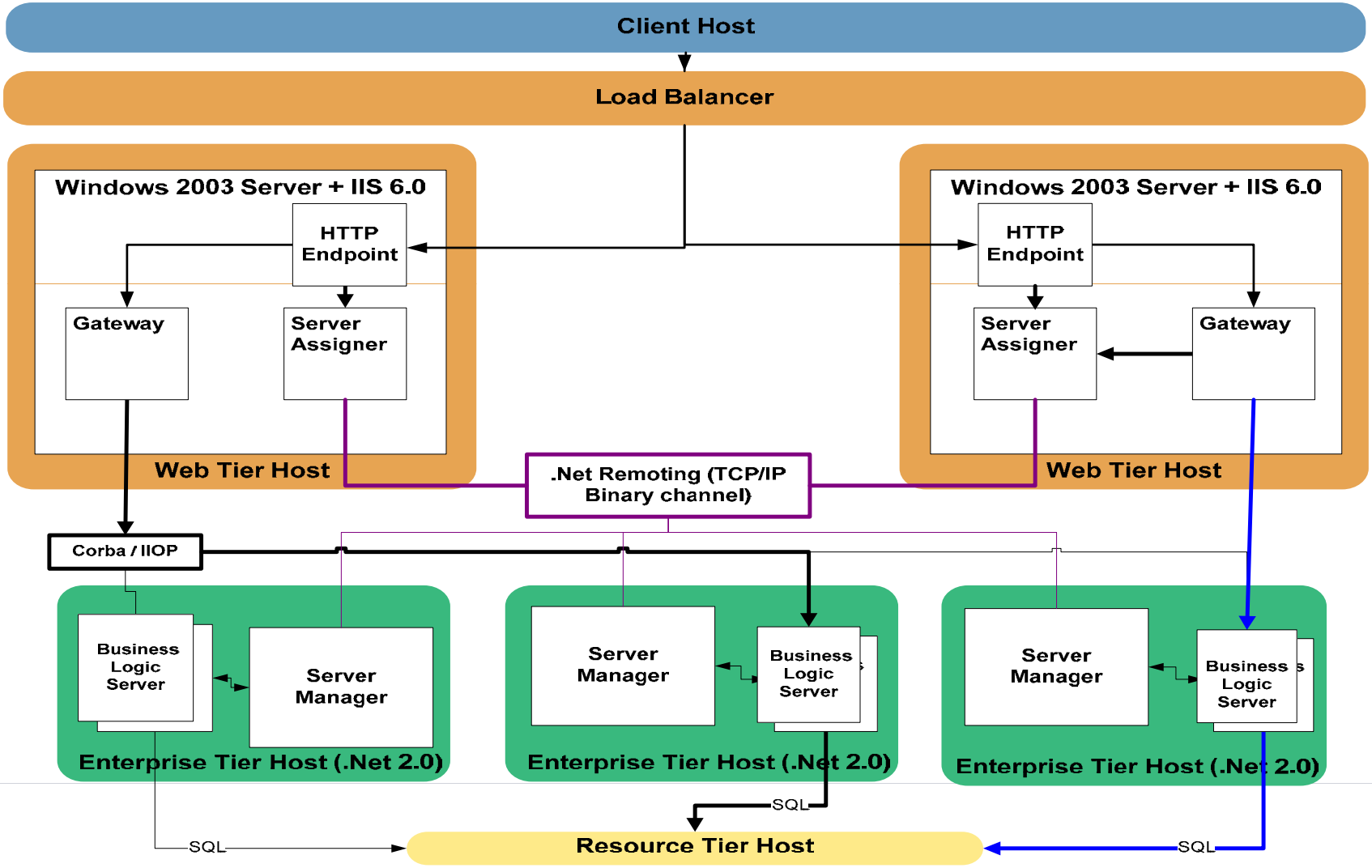
SIEMENS

Horizontal Scalability and Fail-Over Support – J2EE Middle Tier

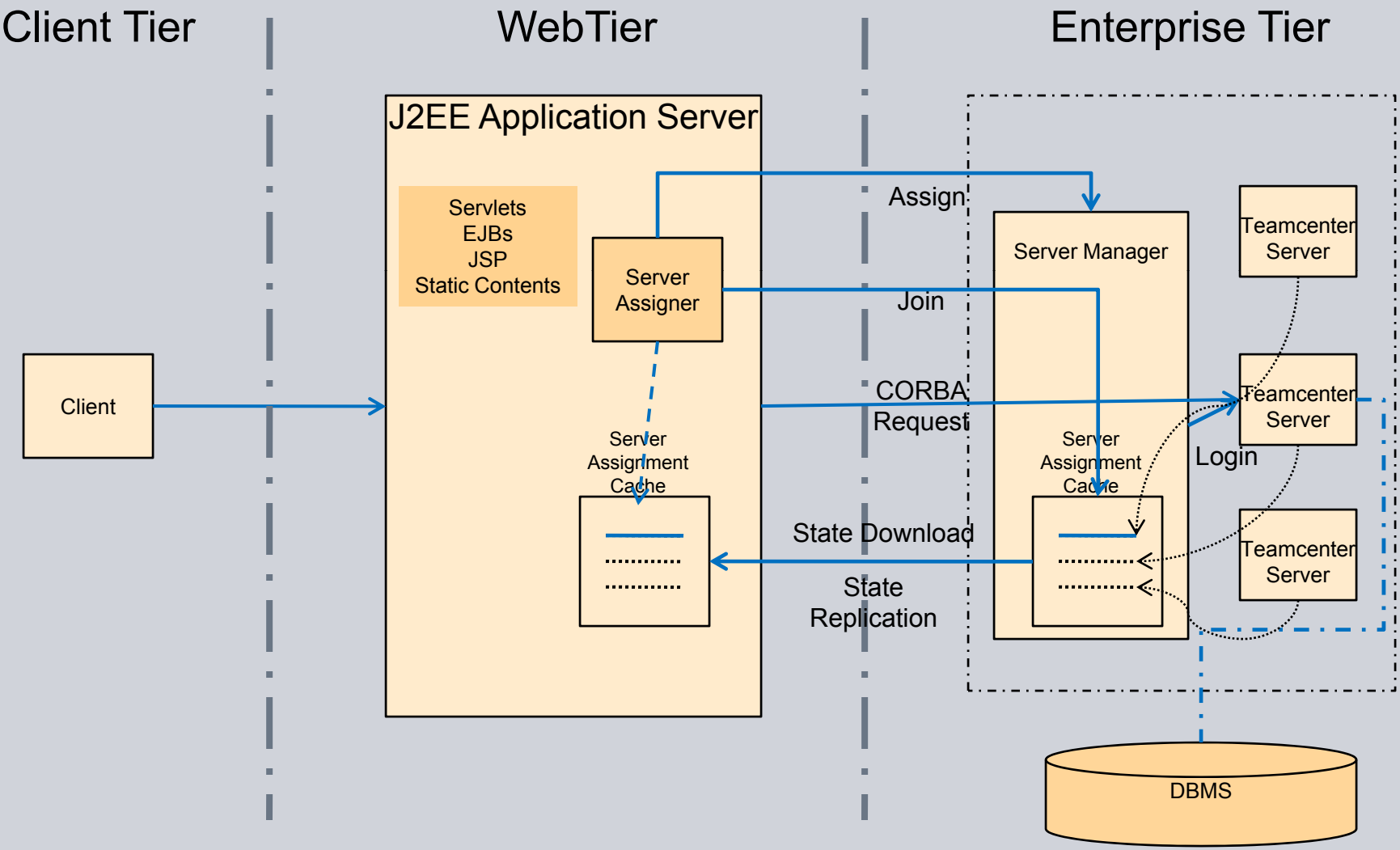


SIEMENS

Horizontal Scalability and Fail-Over Support – .NET Middle Tier



Server Assignment in Teamcenter J2EE Middle Tier



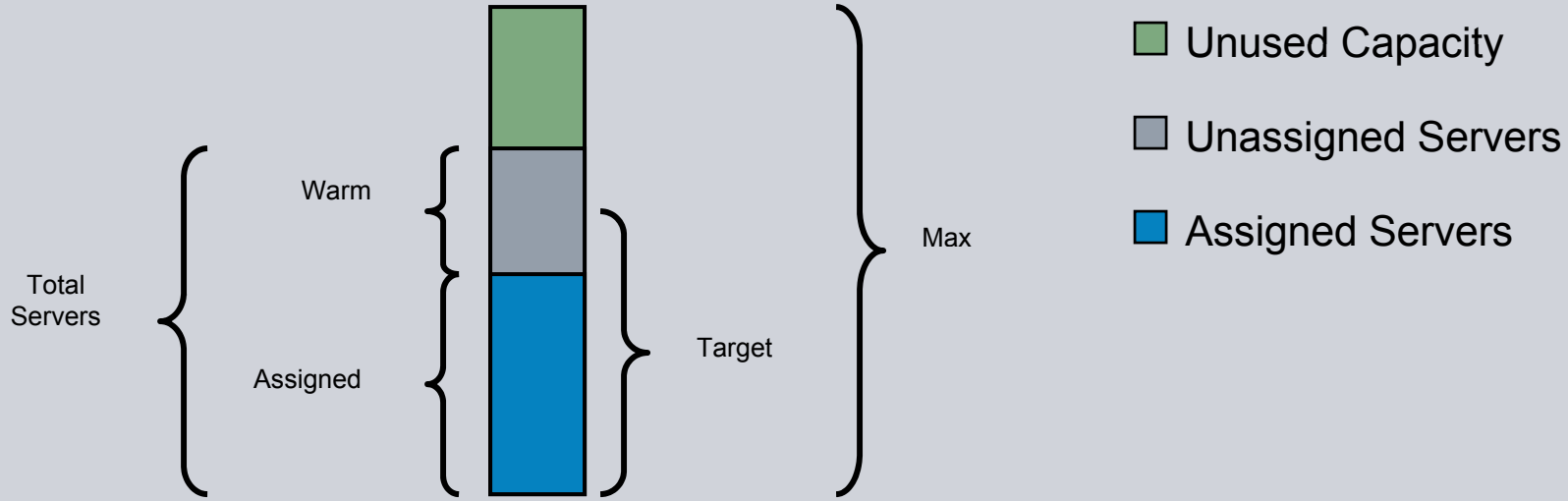
Pool Configuration - Size (J2EE & .NET)

PROCESS_WARM – minimum number of unassigned servers

PROCESS_TARGET – desired number of servers

- Syntax: <time> <target> [, <time> <target>]*
  - 0000 5 – target=5, around the clock
  - 0700 100, 1700 20 – target=100 from 7am to 5pm and 20 from 5pm to 7am.

PROCESS_MAX – maximum number of servers



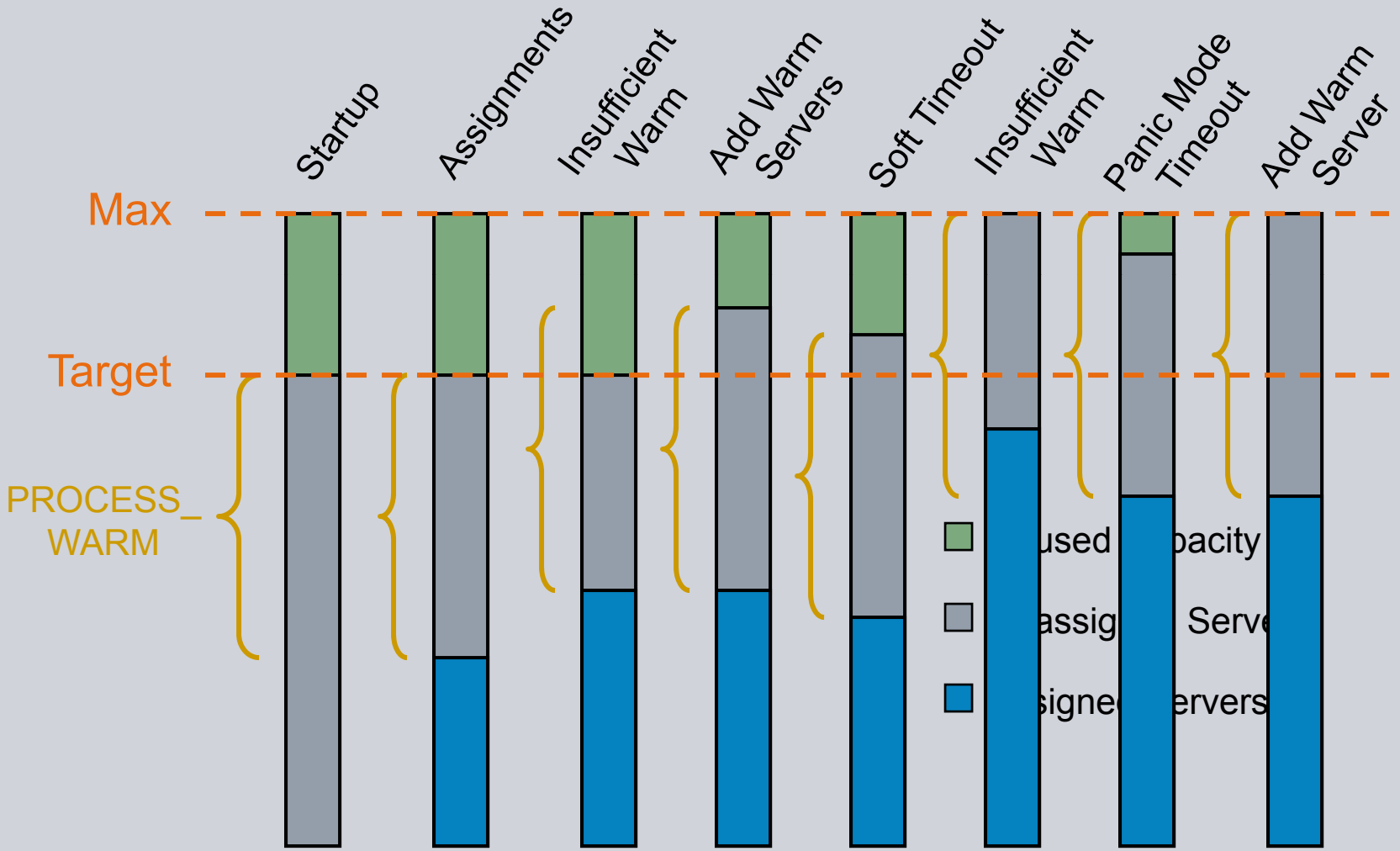
SIEMENS

Pool Configuration – Timeouts (J2EE & .NET)

Timeout Types

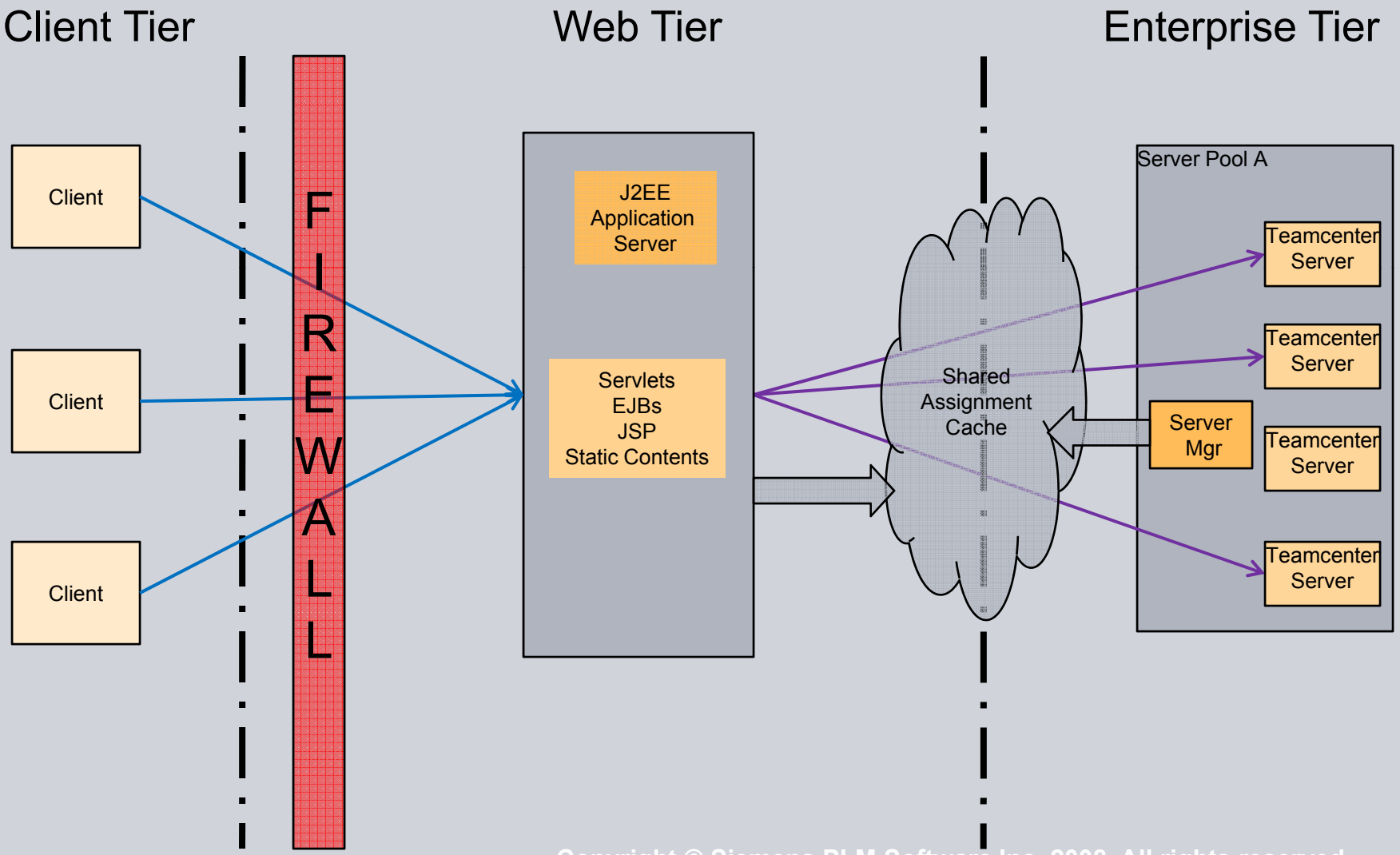
- Soft – Terminate idle server when above target to get back down to target
- Hard – Terminate idle server regardless of pool status
- Panic – Terminate idle server when PROCESS_MAX is reached.
- Query – Terminate active runaway server Statefulness Modes

Server Management Example (J2EE & .NET)



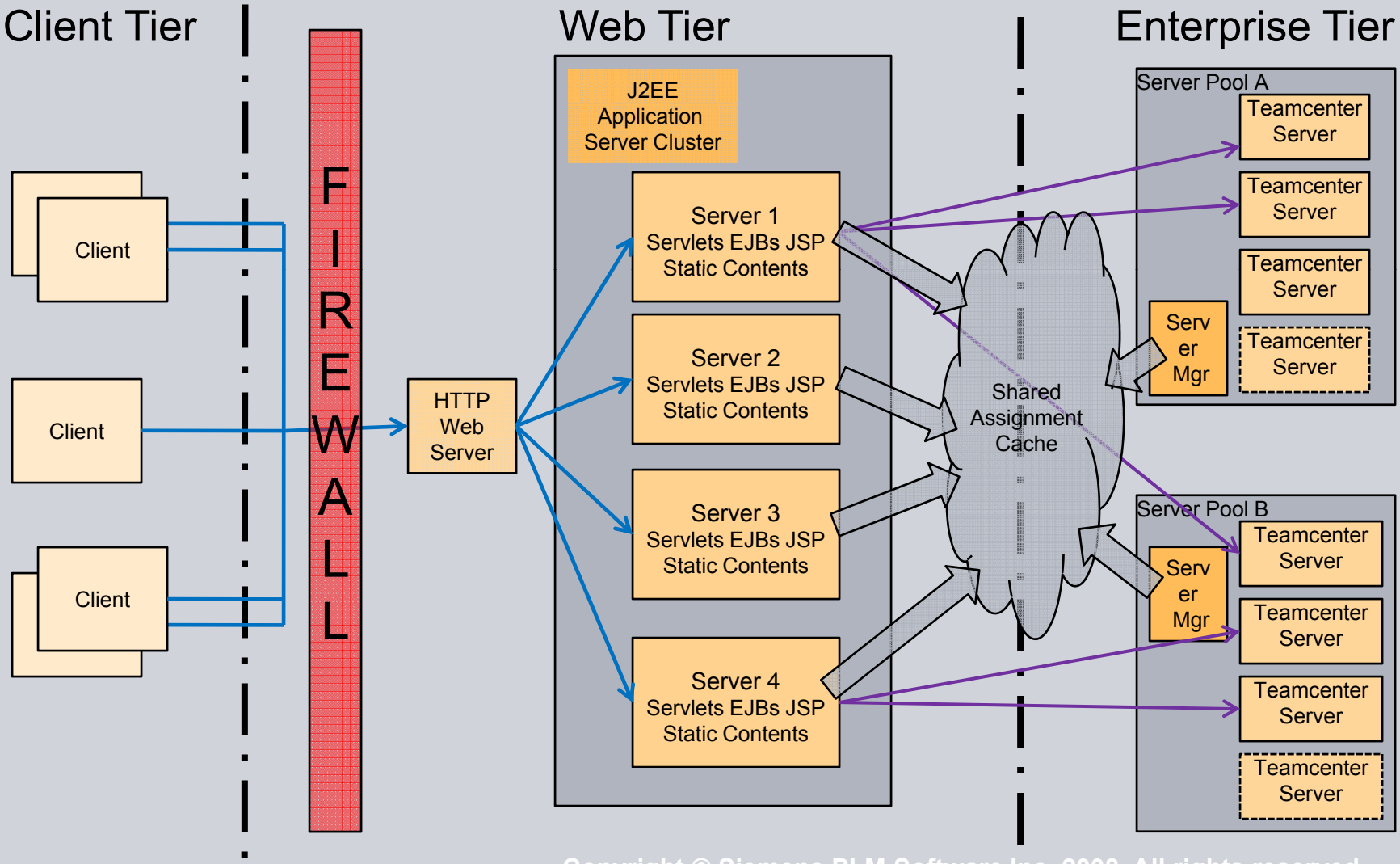
Deployment for Teamcenter J2EE Middle Tier (Basic)

SIEMENS



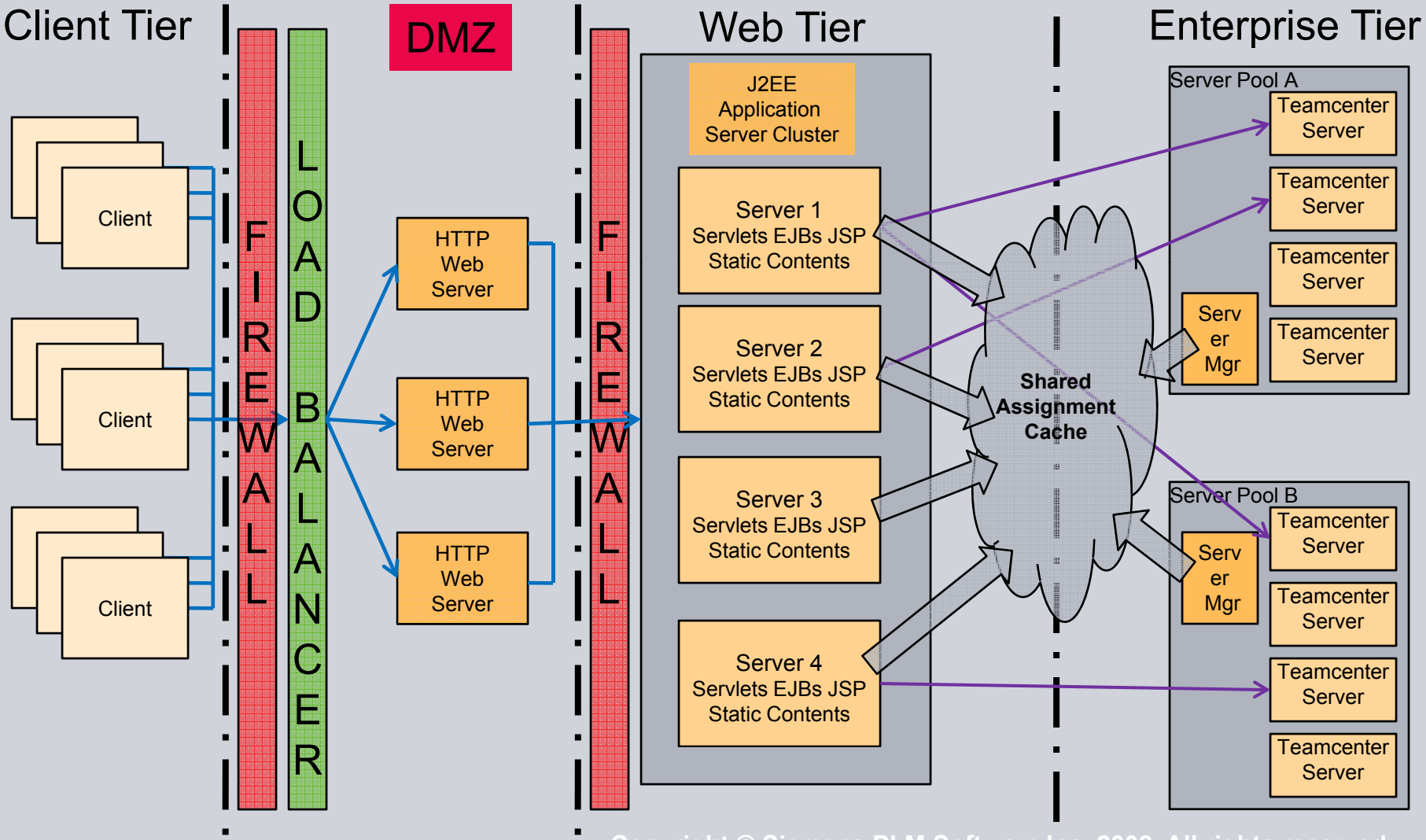
SIEMENS

Deployment for Teamcenter J2EE Middle Tier (Clustering)

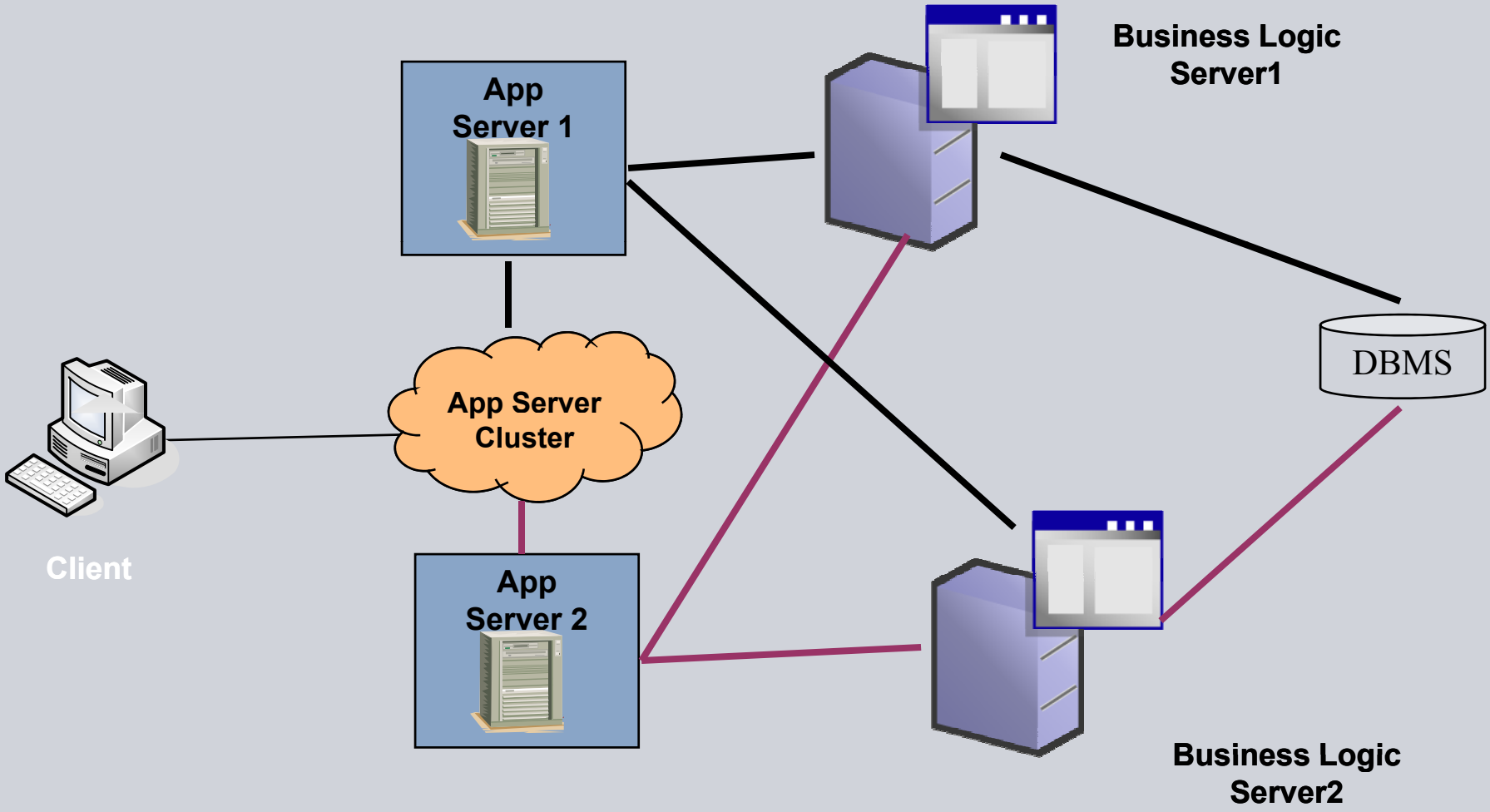


Deployment for Teamcenter J2EE Middle Tier (Clustering with Load Balancer)

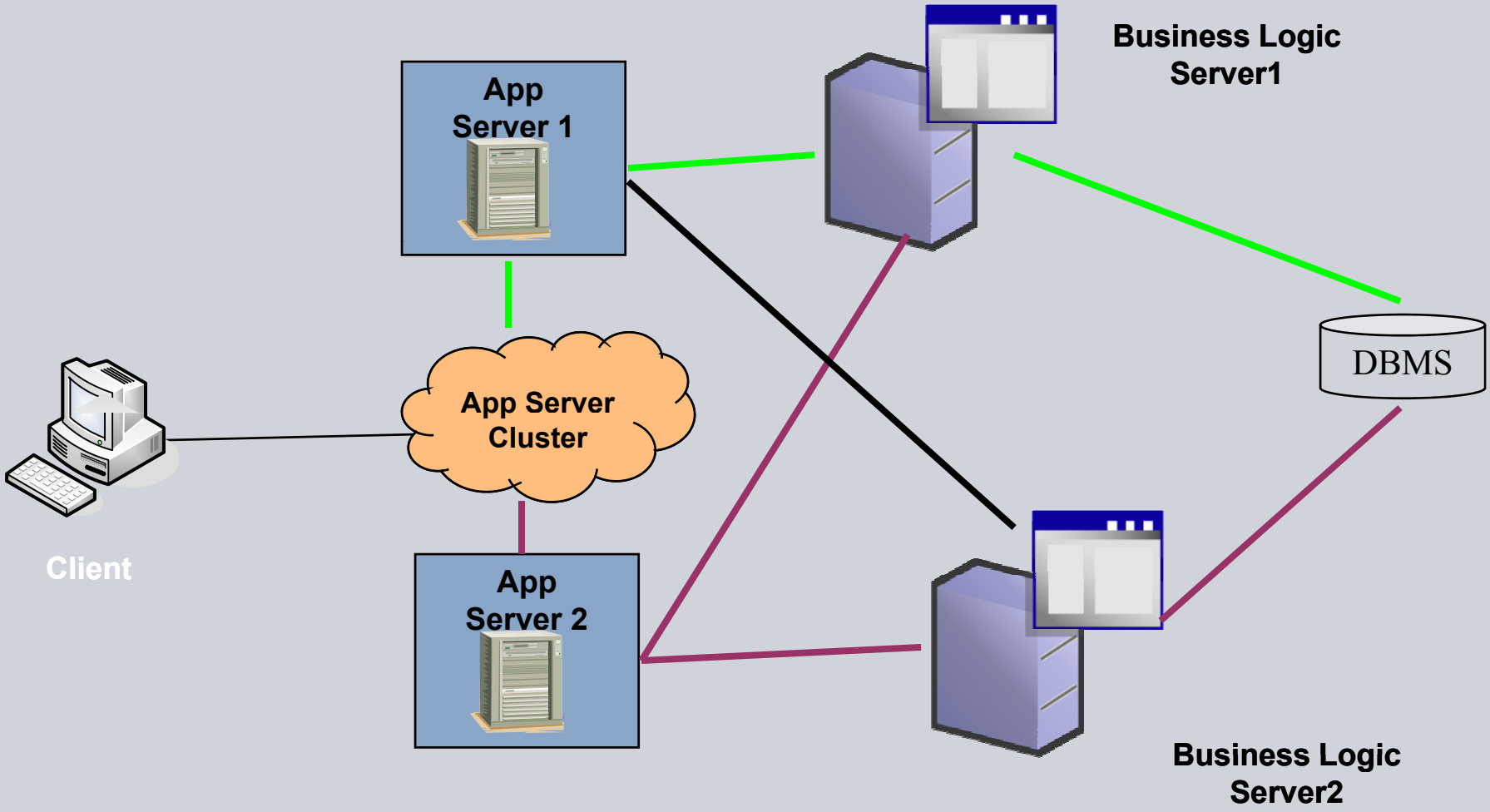
SIEMENS



Business Logic and App Server Failover

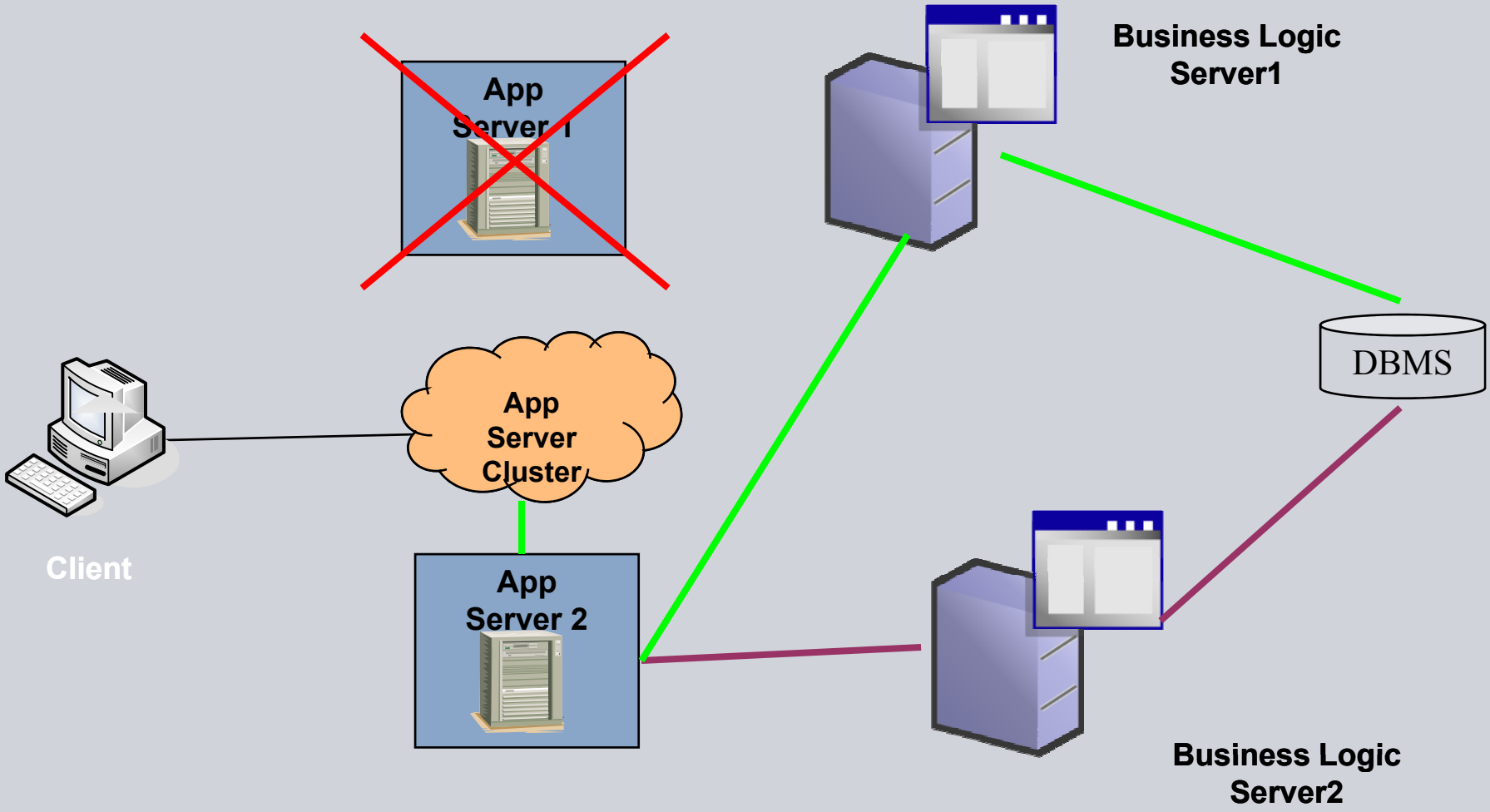


Business Logic and App Server Failover



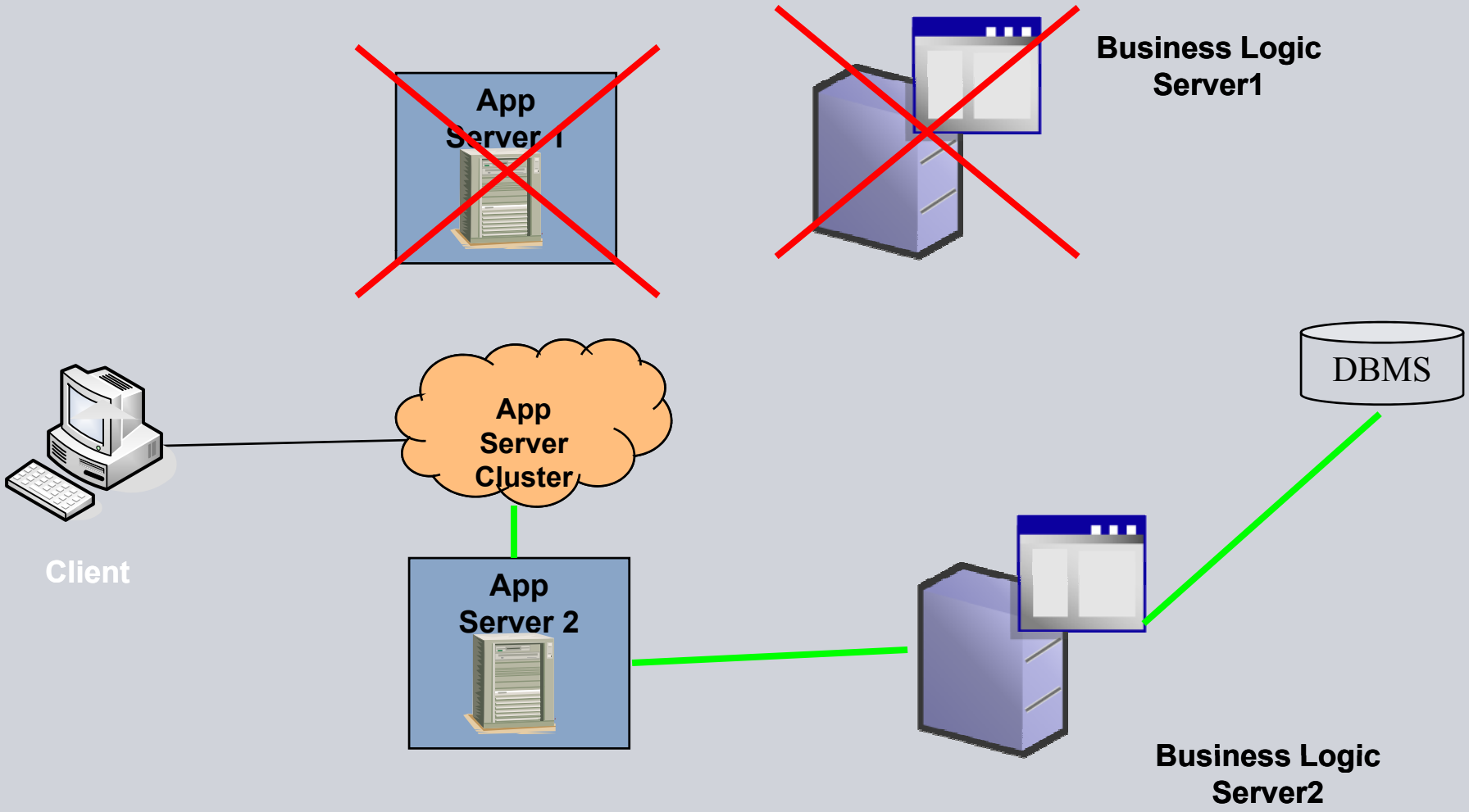
Business Logic and App Server Failover (Terminate App Server 1)

SIEMENS



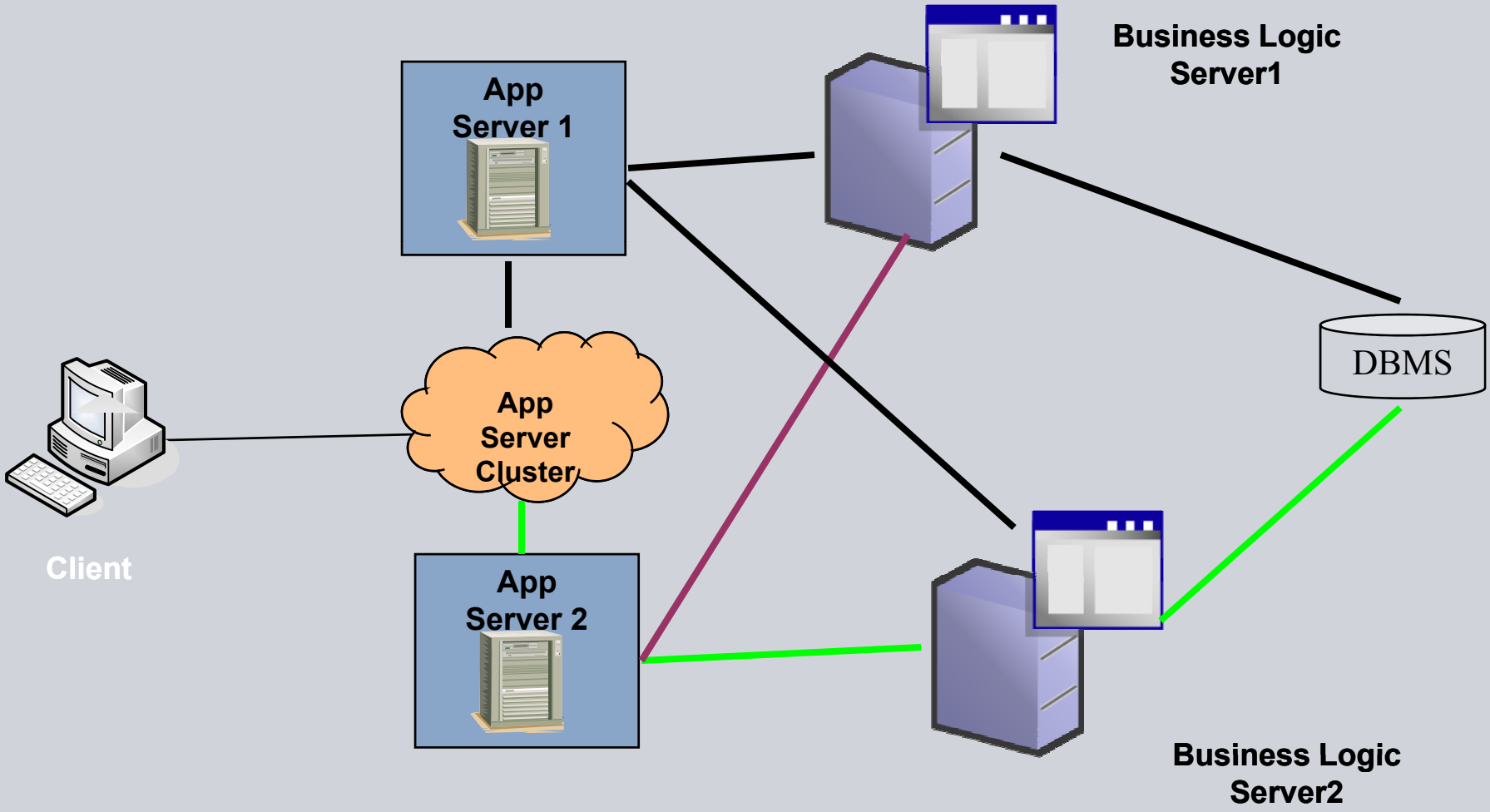
Business Logic and App Server Failover (Terminate Business Server 1)

SIEMENS



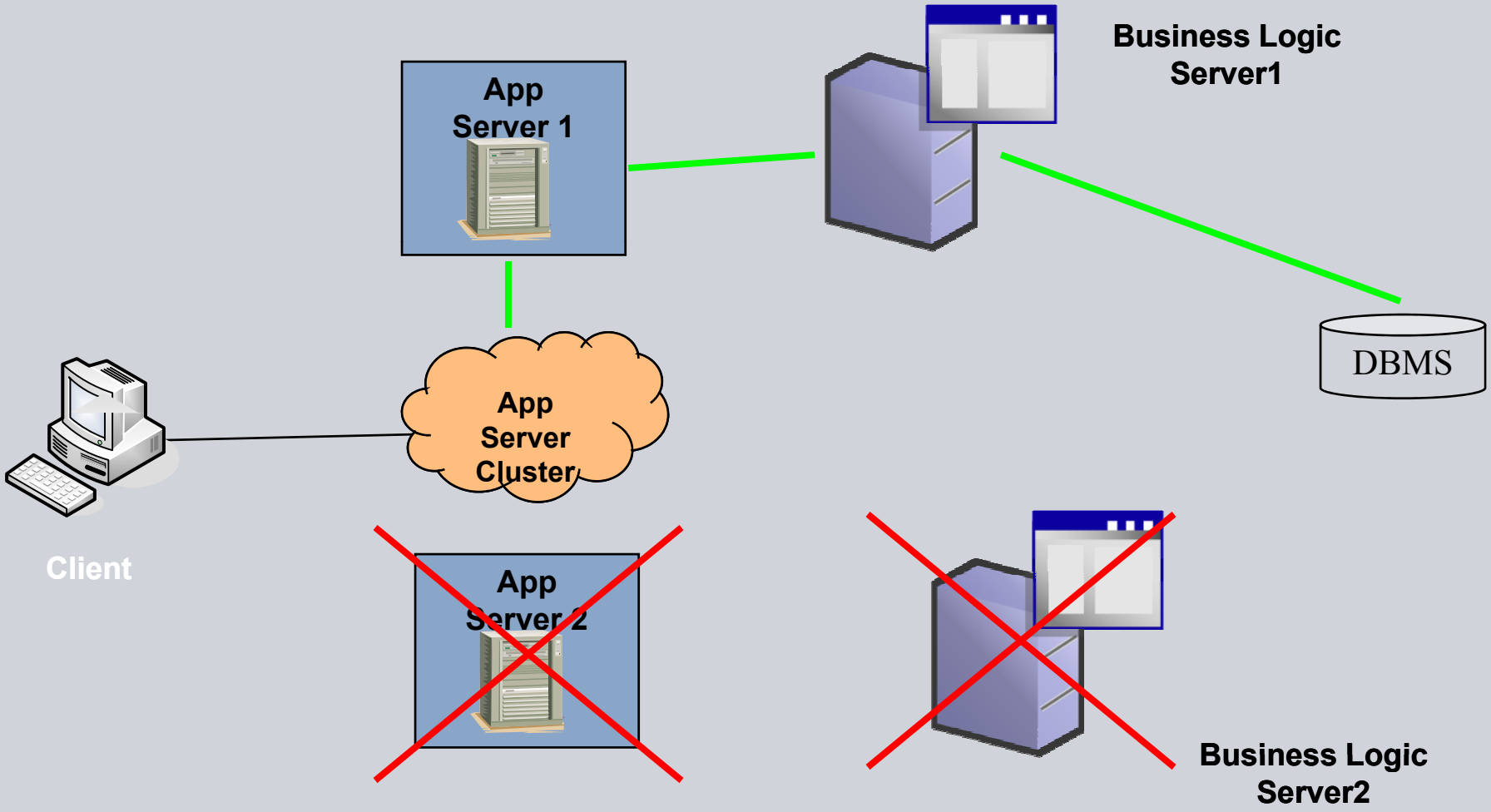
Business Logic and App Server Failover (Restart Server 1's)

SIEMENS



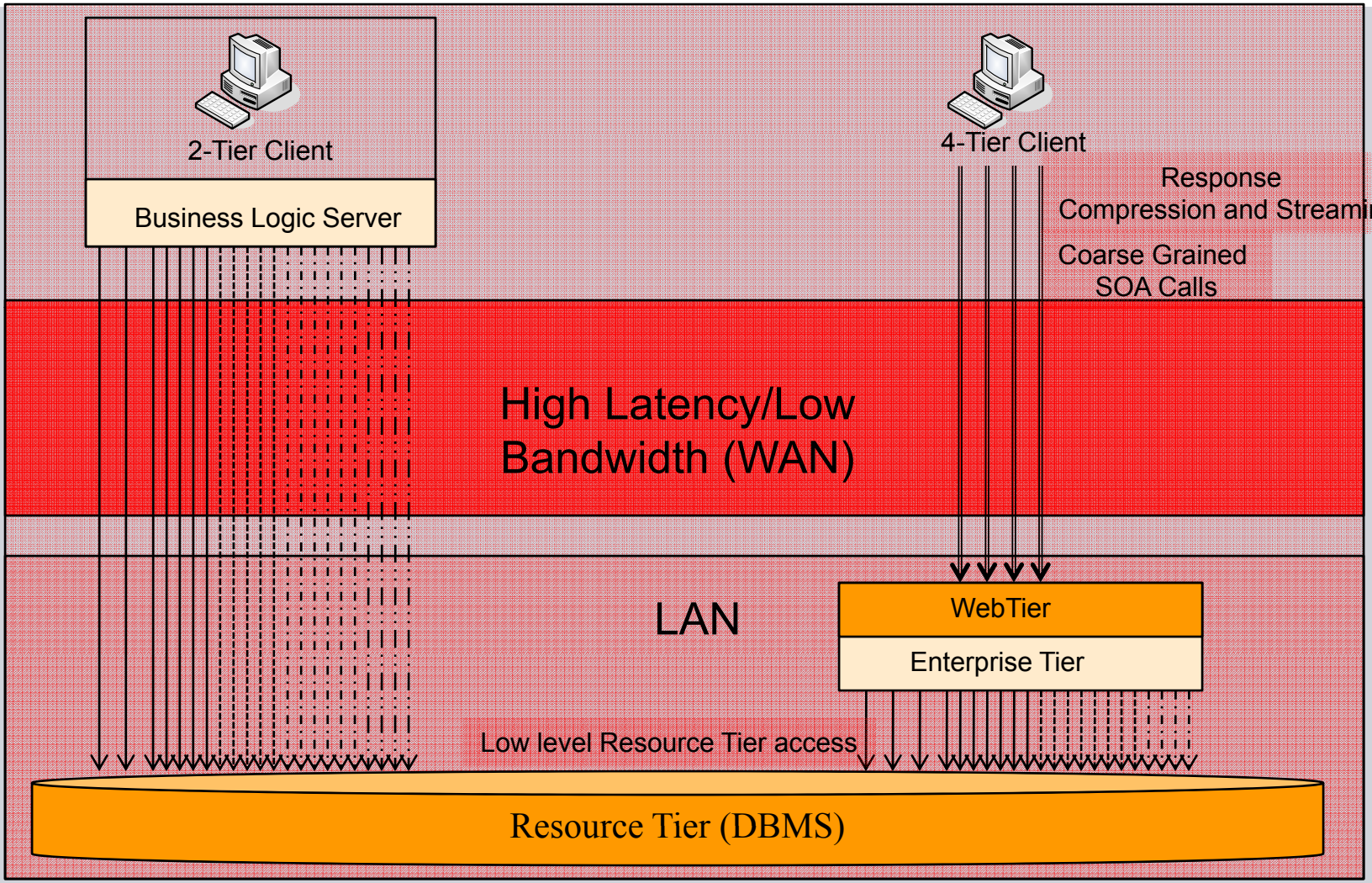
Business Logic and App Server Failover (Terminate Server 2's i.e. double failover)

SIEMENS

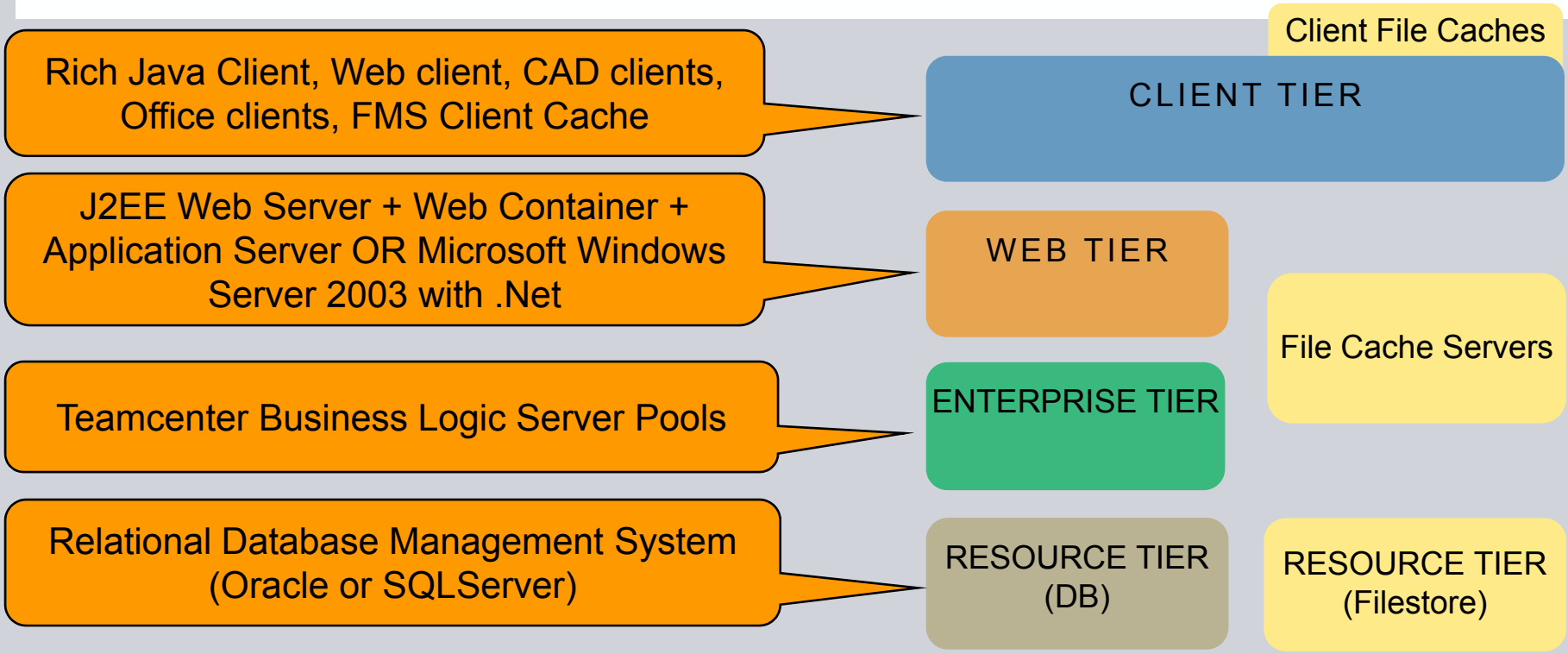


SIEMENS

WAN Performance 2-Tier vs. 4-Tier



Deployment on 4 physical tiers



ADVANTAGE: Great deployment flexibility, security

The hardware for each tier can be configured independently to suit the processing load
Multiple machines can be used at each tier for scalability and failure tolerance
Clients can operate across wide area networks and through firewalls

BUT

Most complex to manage

THEREFORE

Most suitable for large scale deployments where flexibility is the key consideration

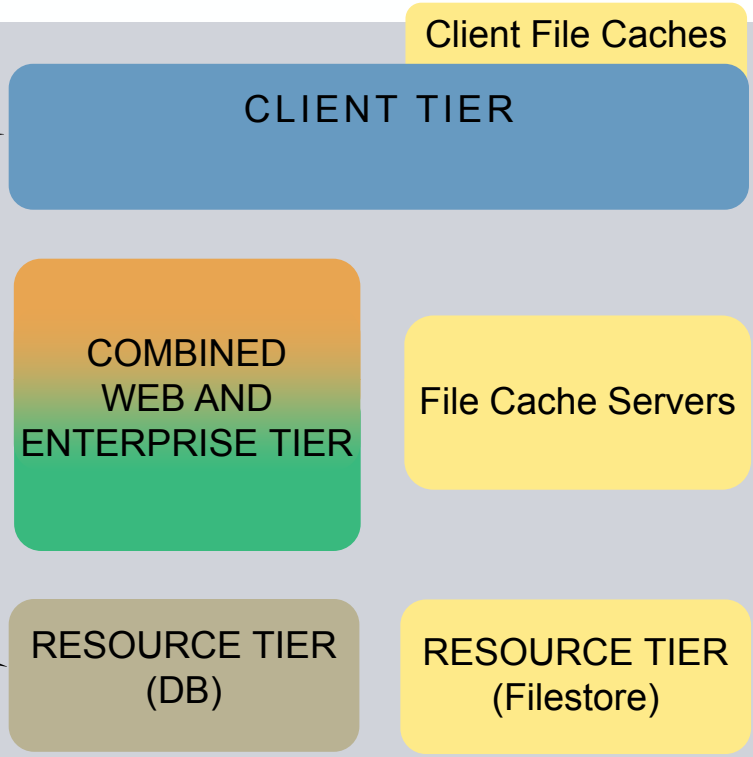
SIEMENS

Deployment on 3 physical tiers

Rich Java Client, Web client, CAD clients, Office clients, FMS Client Cache

J2EE Web Server + Web Container + Application Server OR Microsoft Windows Server 2003 with .Net, Teamcenter Business Logic Server Pools

Relational Database Management System (Oracle or SQLServer)



ADVANTAGE: Balance of flexibility and complexity

Hardware for some tiers can be independently configured to suit the processing load

Multiple machines can be used at each tier for scalability and failure tolerance, adding and removing at run time as necessary

Clients can operate across wide area networks and through firewalls

BUT

Cannot separately configure web and enterprise tier hardware platforms

THEREFORE

Most suitable for medium scale deployments where a balance between flexibility and complexity is desired

2-Tier and 4-Tier Together

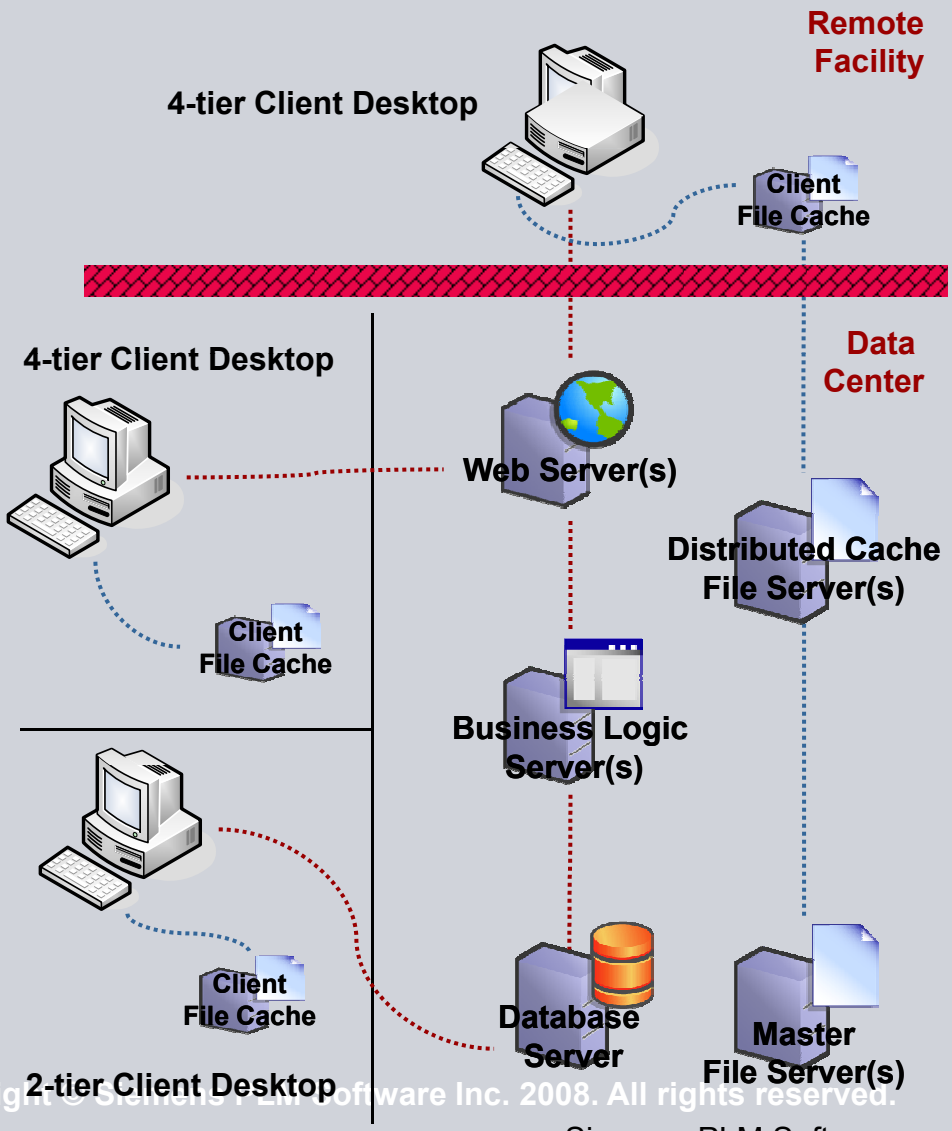
4-tier clients:

- Can connect from remote locations
- Are optimised for performance across a wide area network
- Support secure access through firewalls
- Support all Teamcenter clients and most integrations

2-tier clients

- Are optimised for performance in a local area network
- Are not recommended for use across wide area networks or through firewalls
- Do not support the web client or stand-alone Teamcenter Visualization

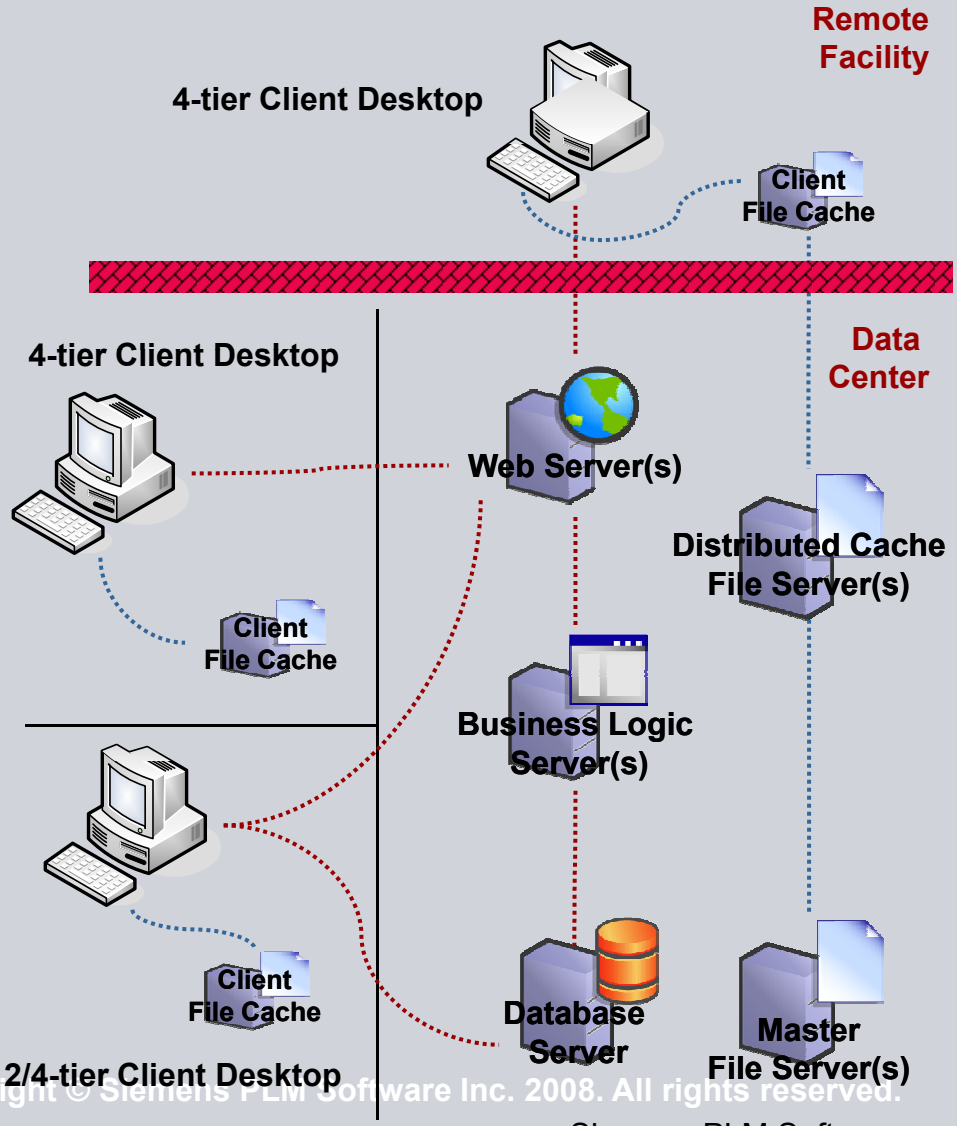
You can deploy both 4-tier and 2-tier for the same database as shown on the right



2-Tier and 4-Tier Together – on one client

You can deploy both 4-tier and 2-tier for the same database as shown on the right
You can mix styles on one client!

- In the LAN, a client can be both for different purposes
  - 2-tier for Rich client and CAD applications
  - 4-tier for visualization and web client
- This is the only way to support stand-alone Teamcenter Visualization and the Web Client on one machine together with 2-tier CAD integration deployment
- Must install Rich Client as either 2 or 4 tier – this cannot switch at run time (but have both on 1 machine)



Teamcenter deployed using the 4 tier architecture is scalable

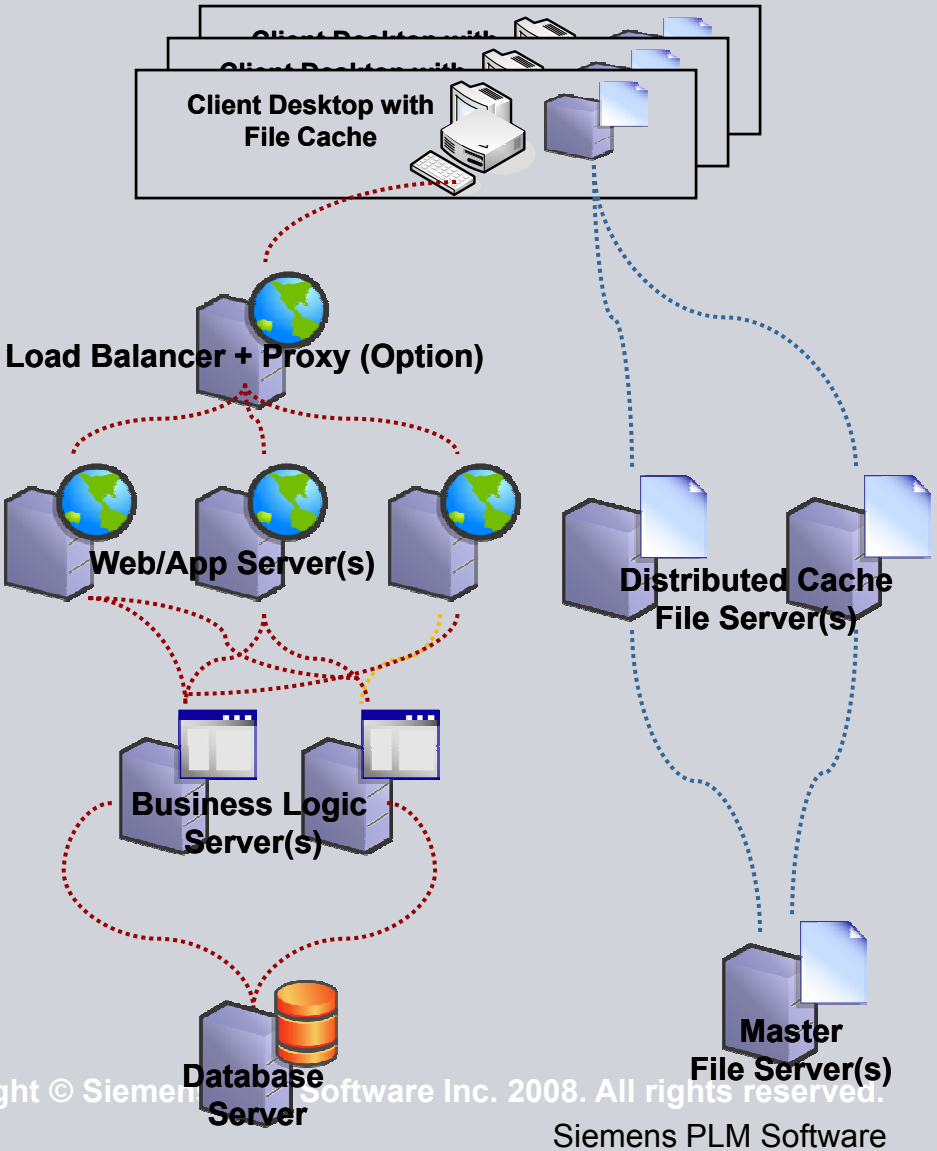
SIEMENS

Horizontal scalability

- Ability to add/remove servers at run-time
- Web Tier and Enterprise Tier are independently scalable
- Web Tier can be load balanced using off the shelf solutions
- Web Tier handles load balancing across Enterprise Tier servers

Vertical scalability

- Server machines at each tier can be independently configured
- Load on each Enterprise Tier machine is managed and can be configured to suit the machine's capabilities
- Network between client and web tier can have significant latency – up to 200ms for rich client, 400ms for web client



SIEMENS

Contact

Vikas Singh
Software Development Manager

E-mail: singh.vikas@siemens.com

www.siemens.com/plm

SIEMENS

Thank You